NORTHROP GRUMMAN

Weapon System Support Software

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Our Clients & Business

Aerospace & Defense Contractor

- Armament Systems
- $30 billion in revenue / year

Harlan Mitchell

- Sr. Systems Engineering Manager

Laurel Enstrom

- Principal Systems Engineer

B-2 Spirit Stealth Bomber
Source: Northrop Grumman

RQ-4 Global Hawk
Source: Northrop Grumman

NORTHROP GRUMMAN

The Problem

Advanced Weapon Systems

Faults with these weapon systems produce a lot of data

NG must dispatch engineers with a tool to collect data

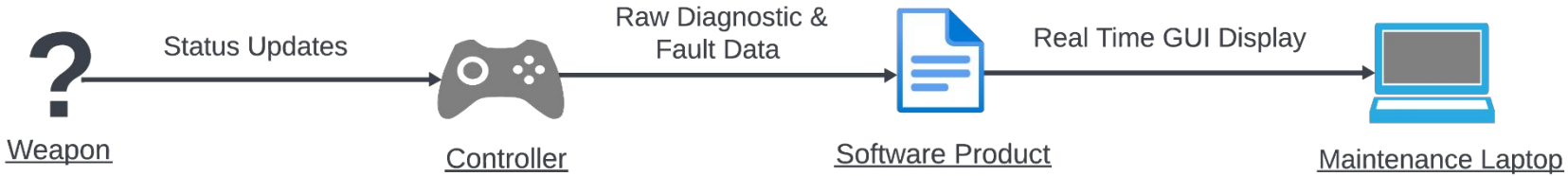
NG will work to resolve the problem, traveling to and from as much as needed

No end-user diagnostic tool

Complex, or insignificant data in existing tool

Expensive to dispatch engineers

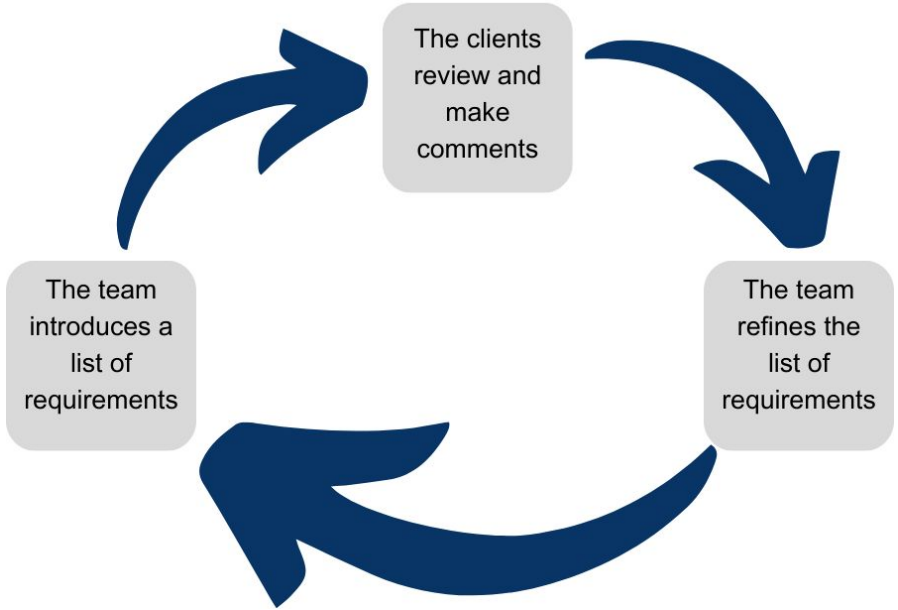
Solution Overview



- Controller will send data to the software application via RS 422 serial communication
- The application will display the data into GUI and log file if selected by user
- The application will be installed by an installer that does not require administrator rights

Implementation Overview

- **Key Requirements**
  - Must be a desktop application
  - Read data via RS 422 serial communication
  - Must be able to output to logfile
  - Must be able to filter weapon events and errors



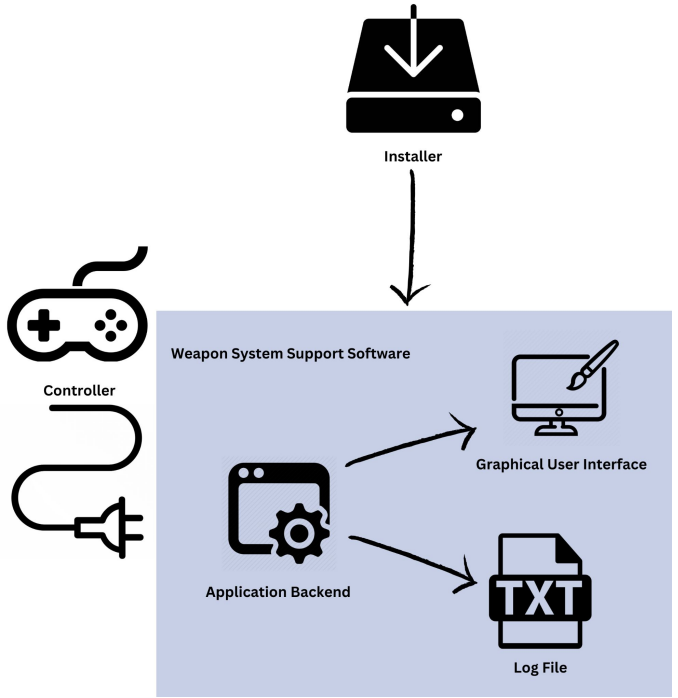
Implementation Overview

QT Framework

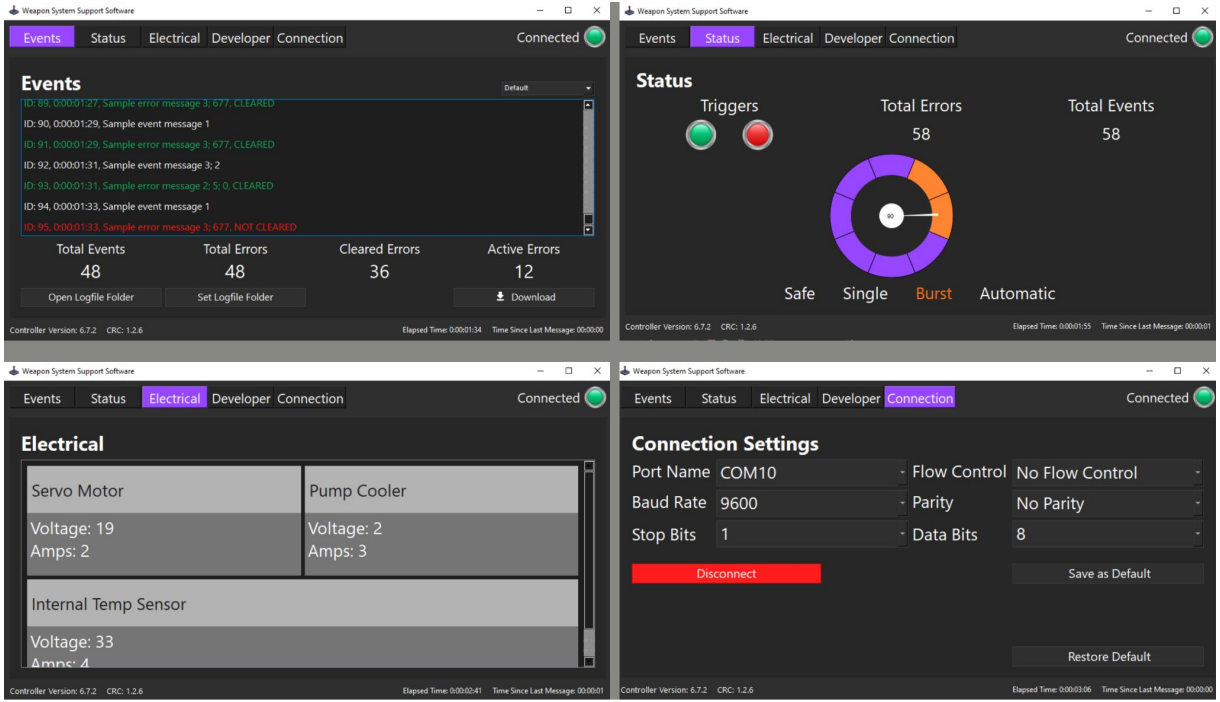
- QT Serial Bus
- QT Serial Port
- QT Graphical User Interface support

C++ Backend

- OOP based classes
- Dynamic memory management

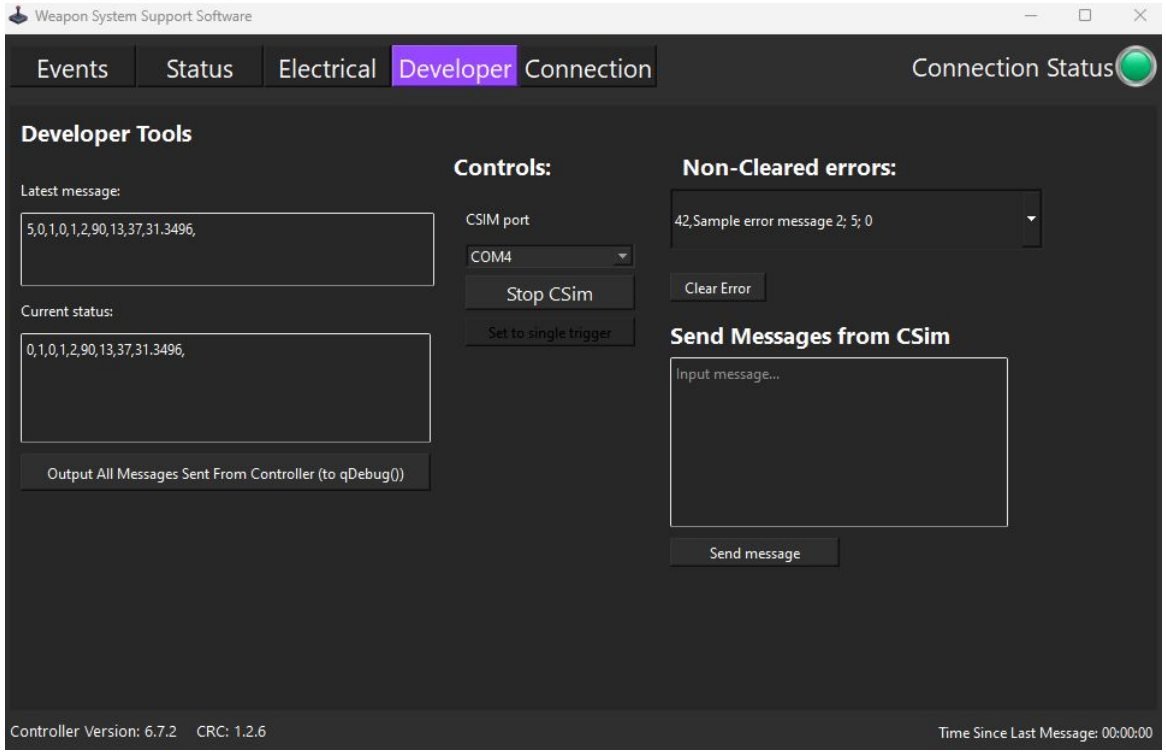


Implementation Details



- Each page interacts directly with a back end class.
- Events, Status, and Electrical classes give the user access to weapon information.
- Connection class controls the serial connection.

Implementation Details Cont.



- Developer page is used to control information flow into our program for testing purposes
- It manages the CSIM (Controller Simulator) class which is run within a thread

Challenges and Resolutions

Risks

Misinformation

- Software Miscalculations
- Serial Protocol Encoding/Decoding Errors

Improper port hardware

- RS422 only

Challenges

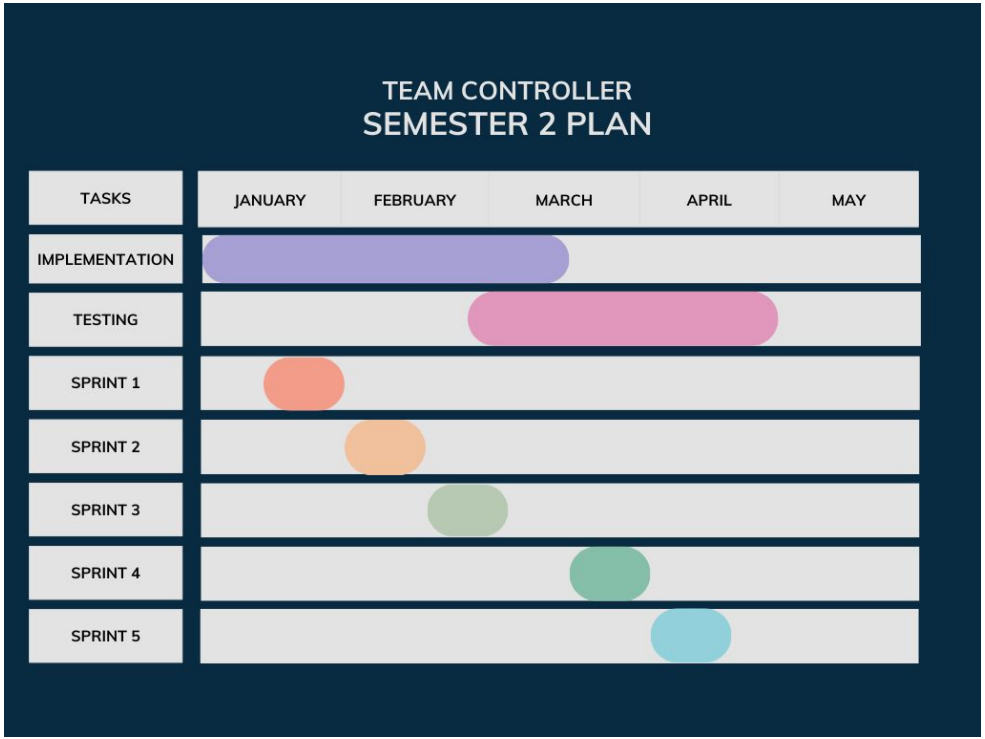
Completed

- Feed position
- Simulated Serial Communication
- Installer

Incomplete

- Testing
- Device to Device serial communication

Schedule



Sprint 3 is done

Current software progress:

- Back-end mostly finished
- Front-end refinement
- Moving on to testing

Conclusion

Our clients are Northrop Grumman and the main issues are:

- Long travel times
- Complex data
- (Lack of) End user tool

Our goal is to provide our clients with an easy to use desktop application that anyone can use.

We currently meet weekly to showcase what has been accomplished with our clients during our two week sprints